

No.

9200187



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Hyperformer Seed Company

Whereas, THERE HAS BEEN PRESENTED TO THE
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'HSC 591'

In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington, D.C.
this 30th day of September in
the year of our Lord one thousand nine
hundred and ninety-four.

Attest:

Kenneth B. Evans
Commissioner

Plant Variety Protection Office
Agricultural Marketing Service

Ulysses S. Grant
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) Helena Chemical Company also d/b/a HyPerformer Seed Company		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO. 36576 and HB89-576	3. VARIETY NAME HSC 591
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) 6075 Poplar Avenue Suite 500 Memphis, TN 38119		5. PHONE (include area code) 901-761-0050	FOR OFFICIAL USE ONLY PVPO NUMBER 9200187 Filing and Examination Fee: \$ 2150. ⁰⁰ Date May 4, 1992 Certificate Fee: \$ 250. ⁰⁰ Date September 2, 1994
6. GENUS AND SPECIES NAME Glycine max	7. FAMILY NAME (Botanical) Leguminosae		
8. CROP KIND NAME (Common Name) Soybean	9. DATE OF DETERMINATION March 1986		
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation		11. IF INCORPORATED, GIVE STATE OF INCORPORATION Delaware	
12. DATE OF INCORPORATION 1977			
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS. Al Hoggard Helena Chemical Company 6075 Poplar, Suite 500 Memphis, TN 38119			
			PHONE (include area code): 901-761-0050

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

- a. ☒ Exhibit A, Origin and Breeding History of the Variety.
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety.
- d. ☒ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office May 1992
- g. ☒ Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.)
☐ YES (If "YES," answer items 16 and 17 below) ☒ NO (If "NO," skip to item 18 below)

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☒ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____) ☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates) ☒ NO
 Marketed for sale the first time in 1992

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.
 The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.
 Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT [Owner(s)] <i>Richard S. Galt</i>	CAPACITY OR TITLE Director of Seed.	DATE 4-29-92
SIGNATURE OF APPLICANT [Owner(s)]	CAPACITY OR TITLE	DATE 1

Exhibit A. Origin and breeding history of the variety

Pedigree: Custer/Dyer//P.I.88788///Bedford

"HSC 591" was derived utilizing a modified pedigree breeding scheme from a cross made by an FFR plant breeder in 1980 at Covington, TN. Single plants from the F2 generation were screened for resistance to the soybean cyst nematode (Heterodera glycines) race 14 (previously classified as race 4). The F3 generation of the resistant plants was yield tested and the F4 was planted near Jackson, TN for single plant harvest. The F5 was grown near Jackson, TN as single plant rows in 1985. The F5 rows were bulk harvested and selected for advancement into replicated yield trials.

HSC 591 was identified as experimental 36576 and first tested in a replicated experiment in 1986 at 4 locations. In 1987, the number of testing locations was expanded and an initial purification increase was begun. Elite testing and seed production continue to the present.

HSC 591 appears stable and uniform through 7 generations of self-pollination and during the seed increase and purification program. Flower, pubescence, and hilum color off-types have appeared at a frequency of up to 0.5% in the past. The variety is essentially free of contaminants at the present time.

9200187

Exhibit B. Novelty Statement

"HSC 591" is most similar to "Hartz 6130"; however, the varieties differ in the following characteristics:

<u>TRAIT</u>	<u>Variety</u>	
	<u>HSC 591</u>	<u>Hartz 6130</u>
Days to maturity	166	164
Plant height (cm)	95	92
Leaf width(cm)	6.7	8.2
Leaf length	11.4	13.2
g/100 seed	12.0	11.7
% protein	37.9	40.3
% oil	23.3	22.2
Seed coat luster	Dull	Shiny
Flower color	White	Purple

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (*Glycine max* L.)

NAME OF APPLICANT(S) <i>Hy Performer Seed Company</i>	TEMPORARY DESIGNATION <i>36576</i>	VARIETY NAME <i>HSC 591</i>
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code)		FOR OFFICIAL USE ONLY
		PVPO NUMBER <i>9200187</i>

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g.,).

1. SEED SHAPE:



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)

2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

2. SEED COAT COLOR: (Mature Seed)



1 = Yellow

2 = Green

3 = Brown

4 = Black

5 = Other (Specify) _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)



1 = Dull ('Corsoy 79'; 'Braxton')

2 = Shiny ('Nebsoy'; 'Gasoy 17')

4. SEED SIZE: (Mature Seed)



Grams per 100 seeds

5. HILUM COLOR: (Mature Seed)



1 = Buff

2 = Yellow

3 = Brown

4 = Gray

5 = Imperfect Black

6 = Black

7 = Other (Specify) _____

6. COTYLEDON COLOR: (Mature Seed)



1 = Yellow

2 = Green

7. SEED PROTEIN PEROXIDASE ACTIVITY:



1 = Low

2 = High

8. SEED PROTEIN ELECTROPHORETIC BAND:

1 = Type A (SP1^a)2 = Type B (SP1^b)

9. HYPOCOTYL COLOR:



1 = Green only ('Evans'; 'Davis')

2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')

3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')

4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

10. LEAFLET SHAPE:



1 = Lanceolate

2 = Oval

3 = Ovate

4 = Other (Specify) _____

11. LEAFLET SIZE:

☒1 = Small ('Amsoy 71'; 'A5312')
3 = Large ('Crawford'; 'Tracy')

2 = Medium ('Corsoy 79'; 'Gasoy 17')

9200187

12. LEAF COLOR:

☒1 = Light Green ('Weber'; 'York')
3 = Dark Green ('Gnome'; 'Tracy')

2 = Medium Green ('Corsoy 79'; 'Braxton')

13. FLOWER COLOR:

☒

1 = White

2 = Purple

3 = White with purple throat

14. POD COLOR:

☒

1 = Tan

2 = Brown

3 = Black

15. PLANT PUBESCENCE COLOR:

☒

1 = Gray

2 = Brown (Tawny)

16. PLANT TYPES:

☒1 = Slender ('Essex'; 'Amsoy 71')
3 = Bushy ('Gnome'; 'Govan')

2 = Intermediate ('Amcor'; 'Braxton')

17. PLANT HABIT:

☒

1 = Determinate ('Gnome'; 'Braxton')

2 = Semi-Determinate ('Will')

3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

18. MATURITY GROUP:

☒1 = 000
9 = VI2 = 00
10 = VII3 = 0
11 = VIII4 = I
12 = IX5 = II
13 = X

6 = III

7 = IV

8 = V

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

☒Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)☒Bacterial Blight (*Pseudomonas glycinea*)☒Wildfire (*Pseudomonas tabaci*)

FUNGAL DISEASES:

☒Brown Spot (*Septoria glycines*)Frogeye Leaf Spot (*Cercospora sojae*)☒

Race 1

☒

Race 2

☒

Race 3

☒

Race 4

☒

Race 5

☐

Other (Specify)

☒Target Spot (*Corynespora cassicola*)☒Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)☒Powdery Mildew (*Microspheera diffusa*)☒Brown Stem Rot (*Cephalosporium gregatum*)☒Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

5

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

9200187

FUNGAL DISEASES: (Continued)

- ☐ Pod and Stem Blight (*Diaporthe phaseolorum* var. *sojae*)
- ☐ Purple Seed Stain (*Cercospora kikuchii*)
- ☒ Rhizoctonia Root Rot (*Rhizoctonia solani*)
- Phytophthora Rot (*Phytophthora megasperma* var. *sojae*)
- ☐ Race 1 ☐ Race 2 ☐ Race 3 ☒ Race 4 ☐ Race 5 ☐ Race 6 ☐ Race 7
- ☐ Race 8 ☐ Race 9 ☐ Other (Specify) _____

VIRAL DISEASES:

- ☐ Bud Blight (Tobacco Ringspot Virus)
- ☐ Yellow Mosaic (Bean Yellow Mosaic Virus)
- ☐ Cowpea Mosaic (Cowpea Chlorotic Virus)
- ☐ Pod Mottle (Bean Pod Mottle Virus)
- ☐ Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

- Soybean Cyst Nematode (*Heterodera glycines*)
- ☐ Race 1 ☐ Race 2 ☒ Race 3 ☒ Race 4 ☐ Other (Specify) Race 5
- ☐ Lance Nematode (*Hoplolaimus Colonus*)
- ☒ Southern Root Knot Nematode (*Meloidogyne incognita*)
- ☐ Northern Root Knot Nematode (*Meloidogyne Hapti*)
- ☐ Peanut Root Knot Nematode (*Meloidogyne arenaria*)
- ☐ Reniform Nematode (*Rotylenchulus reniformis*)
- ☐ OTHER DISEASE NOT ON FORM (Specify): _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- ☒ Iron Chlorosis on Calcareous Soil
- ☐ Other (Specify) _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

- ☐ Mexican Bean Beetle (*Epilachna varivestis*)
- ☐ Potato Leaf Hopper (*Empoasca fabae*)
- ☐ Other (Specify) _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Natty 5164	Seed Coat Luster	Essex
Leaf Shape	77R 595	Seed Size	77R 562
Leaf Color	Bedford	Seed Shape	77R 695
Leaf Size	77R 595	Seedling Pigmentation	

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/POD
				CM Width	CM Length	% Protein	% Oil		
HSC 591 Submitted	166	2.1	95.3	6.7	11.4	37.9	23.3	12.0	
Hark 6/30 Name of Similar Variety	164	2.1	91.9	8.2	13.2	40.3	22.2	11.7	

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBT1-A₂ in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

Exhibit D. Additional Description of the variety.

"HSC 591" is a determinate, late maturity group 5 soybean variety. It has white flowers, tawny pubescence, tan pods, yellow seed coats, and black hilum. It is resistant to the soybean cyst nematode (Heterodera glycines) races 3 and 4 (or 14 depending upon the classification used), and susceptible to race 5. It is susceptible to the Southern root knot nematode (M. incognita). It is resistant to Phytophthora root rot (Phytophthora megasperma var. sojae) race 4 and has demonstrated tolerance in field trials. Its reaction to stem canker (Diaporthe phaseolorum var. caulivora) is classified as moderately resistant.

Exhibit E. Statement of the basis of applicant's ownership.

"HSC 591" was bred and developed by a number of plant breeders employed by FFR Cooperative. The exclusive rights to produce and market HSC 591 have been assigned to HyPerformer Seed Company by FFR Cooperative.